

News

GLOBOX – A Spatially Differentiated Multimedia Fate and Exposure Model

Anneke Wegener Sleeswijk

Institute of Environmental Sciences (CML), Leiden University, Einsteinweg 2, P.O. Box 9518, 2300 RA Leiden, The Netherlands
sleeswijk@cml.leidenuniv.nl

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GLOBOX: The Model

The GLOBOX model – which is largely based on the EU model EUSES – has been constructed primarily for the purpose of calculating region-specific LCA toxicity characterisation factors for every country, sea, or *ecoinvent* emission region in the world (or for a continent, the EU, the OECD, continents or seas as a whole, and the entire world). As a global multimedia fate and exposure model, it may also be used for other purposes. As soon as the GLOBOX model is finished, it will be made available – along with the GLOBACK parameter set – through the CML website <<http://www.leidenuniv.nl/cml/ssp/index.html>>. This will then be announced in this journal.

GLOBACK: The GLOBOX Parameter Sets

The parameter set GLOBACK, belonging to the multimedia fate and exposure model GLOBOX, is now on the web at <http://www.leidenuniv.nl/cml/ssp/index.html>.

The GLOBACK parameter set has been subdivided in two parts:

Part 1: Fate and Exposure

Part 1 contains all the basic parameters that appear in the GLOBOX equations for region-specific intermedia transfer – including a complete, spatially differentiated water balance for the entire global system – and a set of human exposure related parameters, based on country-specific consumption patterns. In this part, the following categories of parameters are distinguished:

- geographic parameters (e.g. surface area; areas and depth of (inland) water; area of glaciers and icefields; land use as arable land, permanent crops, permanent pastures, forest and woodland, and other);
- climatologic parameters (e.g. environmental temperature, wind speed, precipitation rate, yearly rain days and frost period);
- geophysical parameters (e.g. heights/depths of environmental compartments; fractions of air/water/solid particles/organic carbon in different compartments);
- intermedia transfer parameters (e.g. runoff rates; mass transfer coefficients at the interfaces between different compartments; sediment deposition, resuspension, and burial rate; dry deposition rate);
- parameters on hydroxyl radicals (concentration of hydroxyl radicals);
- water-balance parameters (e.g. precipitation; river in- and outflows; groundwater in- and outflows; flow from soil

to groundwater; flows from groundwater to surface water; ground and surface water withdrawals; groundwater outflow to sea; evaporation; surface water outflow to sea);

- human-exposure related parameters (e.g. population; body weight, drinking water consumption, and air inhalation per capita; fraction of drinking water that is groundwater; food consumption patterns; production, import, and export of food products for different food categories).

Part 2: Boundaries and water flows

Part 2 contains the parameters that are related to interregional air and water transport between individual countries, seas, and oceans. In this part, the following categories of parameters are distinguished:

- boundaries between countries;
- boundaries between seas/oceans;
- boundaries between countries and seas/oceans;
- river flows between countries;
- groundwater flows between countries;
- surface water flows from countries to seas/oceans;
- marine water flows between oceans.

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Download <<http://www.leidenuniv.nl/cml/ssp/index.html>>
 The GLOBACK spreadsheets are available in Microsoft Excel (zipped).

- Download [GLOBACK Part 1: Fate and Exposure](#) (version 1.0; 4 November 2005; 500 kB)
- Download [GLOBACK Part 2: Boundaries and water flows](#) (version 1.0; 4 November 2005; 120 kB)

Feedback. I have worked on GLOBACK with pleasure and enthusiasm. I realise, however, that this first version will be far from being perfect. If you might discover any flaws or errors, if you happen to know about better or supplementary data sources, or if you have any other suggestions or comments, I would be eager to learn about them! I hope you will profit from the GLOBACK parameter set, and that it will eventually contribute to a better approximation of the large-scale environmental effects of the emission of chemicals, and even eventually to a cleaner, safer, and more agreeable environment.
 Anneke Wegener Sleeswijk (sleeswijk@cml.leidenuniv.nl)